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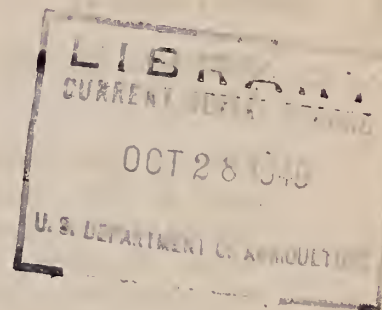
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2100 Robert E. Lee Boulevard
New Orleans 19, Louisiana

PUBLICATIONS AND PATENTS
January-June 1949



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BUREAU OF AGRICULTURAL AND INDUSTRIAL CHEMISTRY
AGRICULTURAL RESEARCH ADMINISTRATION
UNITED STATES DEPARTMENT OF AGRICULTURE

Article
No.

ARTICLES AND ADDRESSES

Apparatus, Analytical Methods, and Techniques

- 1 deGRUY, Ines V.

TEXTILES THROUGH THE MICROSCOPE. The Scientific Monthly 68 (1), 61-5 (1949).

Some of the investigations conducted at the Southern Laboratory are used to illustrate the role of the microscope in textile research. Textile microscopy has been applied to studies of tire cord construction, adhesion, and impregnation; to investigations of mercerized and chemically treated cottons; and of cotton dyeing; to problems of fiber identification; and to many other phases of research on fibers and fabrics. The fiber microscopist has unlimited opportunities to assist first the chemist and ultimately the manufacturer in the development of improved materials for consumer use.

- 2 HOFFPAUIR, Carroll L.

REPORT ON STARCH IN PLANTS. J. Assoc. of Official Agri. Chemists 32 (2), 291-5 (1949).

As a preliminary to collaborative work on the determination of starch in plant materials containing low percentages of starch, several methods of evaluating the calcium chloride dispersions obtained in the Steiner-Guthrie method were investigated. The values so obtained are compared with values obtained by other well known methods for samples of cotton root bark, cotton leaves, orange rind, cottonseed meal and Jerusalem Artichokes.

- 3 HOFFPAUIR, Carroll L., and O'CONNOR, Robert T.

SENSITIZATION OF FUCHSIN-SULFUROUS ACID REAGENT FOR FORMALDEHYDE BY ADDITION OF KETONES. Anal. Chem. 21 (3), 420 (1949).

In efforts to increase the sensitivity of fuchsin-sulfurous acid reagent to small quantities of formaldehyde, the authors observed that acetone caused a more intense and more stable color in the reaction, with no shift in the wave length of maximum absorption, nor any change in the nature of the spectrophotometric curve in the visible spectrum. The curve of percent transmittance vs. concentration in the presence of acetone differed only in intensity of absorption from that obtained without acetone. Similar, but no better, effects were noted for methyl n-propyl ketone, diethyl ketone, diacetone alcohol, and methyl ethyl ketone. Ethylene glycol was found to intensify the color slightly. Fructose, a ketose, had no effect.

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No.

- 4 HOFFPAUIR, Carroll L., and GUTHRIE, John D.

THE USE OF AMINIZED AND PHOSPHORYLATED COTTON FABRICS AS ION EXCHANGE MATERIALS IN THE PREPARATION OF OIL SEED PROTEINS. J. Biol. Chem. 173 (1), 207-12 (1949).

Protein preparations low in ash and phosphorus content may be made by the use of anion exchange materials to increase the pH of oil seed meal suspensions and cation exchange materials to reduce the pH of the protein dispersion to the isoelectric range. Preparations very low in ash and phosphorus may be obtained by the alternate use of aminized cotton fabric and phosphorylated cotton fabric until deionization is almost complete prior to separation of the protein curd. The method is also useful for the purification of protein preparations made by the usual methods. While commercial ion exchange resins may also be used, the results with the fabrics have been better. The fabrics are also more convenient and are readily recovered and regenerated.

- 5 REEVES, Richard E., and JUNG, Julius R. Jr.

CUPRAMMONIUM-GLYCOSIDE COMPLEXES. I. CONDUCTOMETRIC MEASUREMENTS. J. Am. Chem. Soc. 71 (1), 209-11 (1949).

A conductometric method is described that is capable of measuring the relative affinities of various substances for cuprammonium. Differences in affinity were observed for the optically active and meso forms of 2,3-butanediol. Differences were noted in the behavior of various methyl α -hexosides, and between various α - and β -pyranoside pairs. The substance D-glucosan $\langle 1,5 \rangle \beta \langle 1,6 \rangle$ was shown to react with cuprammonium solution.

- 6 REEVES, Richard E.

CUPRAMMONIUM-GLYCOSIDE COMPLEXES. II. THE ANGLE BETWEEN HYDROXYL GROUPS ON ADJACENT CARBON ATOMS. J. Am. Chem. Soc. 71 (1), 212-14 (1949).

The position is taken that complex formation between cuprammonium and two hydroxyl groups occurs most readily when the hydroxyl groups are located at a particular distance apart. Examination of cellulose and a number of other substances having hydroxyl groups on adjacent carbon atoms held more or less rigidly at a number of angles (hence distances) has shown complex formation to occur readily at the true cis-position (0-degree angle) and the 60-degree angle, but not at the 120-degree or the 180-degree angle.

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No.

7 REEVES, Richard E.

CUPRAMMONIUM-GLYCOSIDE COMPLEXES. III. THE CONFORMATION OF THE D-GLUCOPYRANOSIDE RING IN SOLUTION. J. Am. Chem. Soc. 71 (1), 215-17 (1949).

Consideration of the properties of 17 D-glucopyranoside derivatives has led to the conclusion that, in this series, complex formation between cuprammonium and two hydroxyl groups occurs only with the glycol on the second and third or third and fourth carbon atoms.

Consideration of the behavior of 12 complex-forming glucosides in the light of a previously presented theory reduces from eight to not more than three the number of conformations which need be considered to represent the shape of the pyranoside ring of each glucoside in solution; for three of the substances only one ring conformation appears to be possible. It is noted that a single ring conformation, the trans "chair form" in which the ring oxygen and 6-carbon atom project on the same side of the plane of the 1,2,4,5-carbon atoms, is sufficient to explain the behavior of all the complex forming glucosides in solution.

8 REEVES, Richard E.

CUPRAMMONIUM-GLYCOSIDE COMPLEXES. IV. THE CONFORMATION OF THE GALACTOPYRANOSIDE RING IN SOLUTION. J. Am. Chem. Soc. 71 (5), 1737-9 (1949).

Nineteen substances belonging or related to the galactopyranosides were investigated in cuprammonium solution. It was observed that the behavior of D-galactopyranosides and L-arabopyranosides is compatible with ring conformation 1C, L-fucosides and D-arabinopyranosides with the mirror image conformation, 1C. The pyranose ring of D-galactosan $\langle 1,5 \rangle \beta \langle 1,6 \rangle$ exists in the 1C conformation; thus the ring shape of the anhydride is different from that of the methyl and phenyl D-galactopyranosides.

9 REEVES, Richard E.

CUPRAMMONIUM-GLYCOSIDE COMPLEXES. V. THE CONFORMATION OF THE PYRANOSE RING IN SOME D-HEXOSE $\langle 1,5 \rangle \beta \langle 1,6 \rangle$ ANHYDRIDES. J. Am. Chem. Soc. 71 (6), 2116-19 (1949).

It is observed that only two of the eight Sachse strainless pyranose ring conformations meet the steric requirements of the hexose $\langle 1,5 \rangle \beta \langle 1,6 \rangle$ anhydrides (the levoglucosan type of anhydrides). Furthermore, only one of these two conformations would result in the behavior observed for five D-hexosans, four monomethyl-D-hexosans, and one mono-

benzyl-D-hexosan. Therefore a definite assignment of conformation can be made for the pyranose ring in this group of substances. The ring must exist in the chair form 1C, the one in which the ring oxygen atom and carbon atom 6 project on opposite sides of the plane of carbon atoms 1,2,4,5.

Methyl 3-methyl- β -D-idoside, 2,4-dibenzyl-3-methyl-D-glucosan $\langle 1,5 \rangle \beta \langle 1,6 \rangle$, and 4-methyl-D-mannosan $\langle 1,5 \rangle \beta \langle 1,6 \rangle$ were prepared in the form of syrups and were characterized by means of optical rotations.

3-methyl-D-glucosan $\langle 1,5 \rangle \beta \langle 1,6 \rangle$, 2-methyl-D-galactosan $\langle 1,5 \rangle \beta \langle 1,6 \rangle$, 4-benzyl-D-mannosan $\langle 1,5 \rangle \beta \langle 1,6 \rangle$, 3-methyl-D-idosan $\langle 1,5 \rangle \beta \langle 1,6 \rangle$ were prepared in crystalline form.

10 REEVES, Richard E.

DIRECT TITRATION OF CIS GLYCOLS WITH LEAD TETRAACETATE. Anal. Chem. 21 (6), 751 (1949).

Neighboring hydroxyl groups oriented in the true cis position react with lead tetraacetate so rapidly that they may be determined by direct potentiometric titration employing lead and platinum electrodes.

11 SEGAL, Leon, TRIPP, Rita C., TRIPP, Verne W., and CONRAD, Carl M.

DETERMINATION OF CELLULOSE BY ACID-DICHROMATE OXIDATION. Anal. Chem. 21 (6), 712-18 (1949).

A study of the technique of Kettering and Conrad for the volumetric acid-dichromate determination of cellulose in cotton fiber, made with a view to accounting for the lower than theoretical cellulose values obtained, permitted the following conclusions: From 0.5 to 0.6 percent moisture, depending on the atmospheric condition of the room, is retained in cotton samples dried to constant weight in an air oven at 103 to 110 degrees C. Acid-dichromate oxidation fails to convert all the cellulose (or dextrose or sucrose) into carbon dioxide and water. The amount of ash- and moisture-free cellulose accounted for is only 98.33 percent of the theory. Carbon monoxide is formed during the acid-dichromate oxidation of cellulose, and in the usual technique escapes into the air. The amount of cellulose "lost" in this way amounts to 1.66 percent. Acetic acid is not a product of the acid-dichromate oxidation of cellulose. Accurate cellulose analysis can be accomplished by the use of an experimental milliequivalent weight, 6.861 mg., based on the observed relative amounts of carbon monoxide and carbon dioxide formed during the acid-dichromate oxidation.

Article
No.

- 12 TALLANT, John D.

USE OF PROBABILITY PAPER FOR ESTIMATING THE MEAN AND STANDARD DEVIATION OF NORMALLY DISTRIBUTED TEXTILE TEST DATA. Textile Research J. 19 (5), 270-3 (1949).

The use of probability paper for estimating the mean and standard deviation of normally distributed test data is illustrated through use of textile test data for strength. The method is time-saving in handling a large number of samples. A brief discussion is given of the mathematical theory substantiating the method.

SEE ALSO NOS. 16, 17, 19, 21, 28, 29, 30, and 37.

Cotton and Cotton Products

- 13 APPLEBY, Dorothy K.

THE ACTION OF LIGHT ON TEXTILE MATERIALS. A REVIEW OF THE LITERATURE. Am. Dyestuff Reporter 38 (4), 149-56, 189-92 (1949).

Findings reported by various investigators from 1920-1948 on the action of light on cotton, bast fibers, wool, silk, and manufactured fibers are reviewed and compared. A bibliography consisting of 232 references is appended.

- 14 CORLEY, James R.

DRAFTING LONG, FINE-FIBER COTTONS ON SUPER-DRAFT ROVING FRAME. Textile Industries 113 (3), 110-13, 223 (1949).

Investigation of the non-uniformity of roving produced from long, fine-fiber cottons on the Super-Draft system disclosed that these fibers are more sensitive to the influences of draft allocation than are short coarse-fiber cottons. After studies using both the existing draft table and a wide range of experimental settings, a new draft guide was developed which substantially improved the evenness of yarns and roving manufactured from two cottons with staples longer than 1 inch. This new draft guide employs advantageously three critical factors in draft allocation: the ratio of the rear zone draft to the total draft of the compound drafting section; the ratio of the rear zone draft to the weight of the stock fed; and the length of the total draft of the compound drafting section.

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- 15 EVANS, Robert B.

RAYON PRICES: PAST, PRESENT, AND FUTURE. Mimeographed, 33 pp.
AIC-235, April 1949.

This study has been prepared especially to provide the cotton industry with up-to-date information on the price of cotton's principal competitor, rayon. Trends on staple, yarn and manufactured goods from rayon and from cotton are compared, and some of the factors which may influence future price trends are discussed. In addition, some data on comparative prices of other synthetic fibers are included.

- 16 GEORGES, Louis W., and HAMALAINEN, Carl

SOME NEW POLYHALOGENATED PHENYL ISOCYANATES. J. Am. Chem. Soc. 71
(2), 743 (1949).

The preparation of polyhalogenated phenyl isocyanates, used experimentally in the production of fire-resistant cotton textiles by a process recently patented (patent No. 2,428,843), is described. These are believed to be new compounds.

- 17 HAMALAINEN, Carl, and REID, J. David

PARTIAL ACETYLATION OF COTTON CELLULOSE BY KETENE. Ind. & Eng. Chem. 41 (5), 1018-21 (1949).

Linters and cotton sewing thread have been acetylated with ketene. Treatment involves preswelling with water, removal of excess water by extraction, suspension of the cotton in an inert solvent (preferably ether) containing a catalyst, (preferably perchloric acid), and treatment with ketene as prepared by pyrolysis of acetone. Samples containing up to 17% acetyl retained their fibrous structure with only slight degradation. The ketene acetylation was accompanied by an objectionable polymerization of ketene which produced a yellow to dark brown coloration of the sample. The color could be removed by hot alcohol.

Although the emphasis was on the reaction of water-activated, solvent-dehydrated cellulose with ketene, some experiments were tried in which the cotton was swollen with acetic acid before the introduction of the ketene. The acetylation was probably due to the acetic anhydride formed.

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18 KIME, James A.

ENTER, NEW COTTON PRODUCTS. Presented before the Fourth Annual Meeting of the Texas Chemurgic Council, Houston, Texas, March 5, 1949, and under the title "New Cotton Products Through Chemistry" at the Tenth Annual Meeting of the Agricultural Council of Arkansas, Memphis, Tenn., March 28, 1949. AIC-229. 7 pp.

The theme of this paper is chemical modification of cotton cellulose to produce specific cotton products. After a brief discussion of the chemical make-up of cotton, five modifications are reviewed: aminization, carboxymethylation, partial acetylation, oxidation, and mercerization. In each case, the process is described briefly, and the possibilities for utilizing it in the production of specific cotton products are outlined.

The chemist's contribution to cottonseed research is discussed and illustrated by a resume of Southern Laboratory investigations on storage, solvent fractionation, and pigment gland studies.

19 LESSLIE, Claire, HAGAN, Lamont, and GUTHRIE, John D.

DETERMINATION OF WAX CONTENT OF RAW COTTON FIBER. NONVALIDITY OF PRELIMINARY TREATMENT WITH HYDROCHLORIC ACID. Anal. Chem. 21 (1), 190-1 (1949).

From data assembled on samples of cotton given various treatments prior to the extraction of wax, the authors conclude that preliminary treatment with hydrochloric acid renders the results inaccurate. The acid converts a water-soluble substance or substances to a material which behaves like wax and makes the wax value too high. The nature of these water-soluble substances is unknown. Their behavior is similar to that exhibited by fructose when introduced into purified cotton linters; but the sugar content of raw cotton fiber is not large enough to explain all the increase produced by hydrochloric acid treatments.

20 ROLLINS, Mary L., FORT, Hazel H., and SKAU, Dorothy B.

CELLULOSE-WATER RELATIONS: A SELECTED BIBLIOGRAPHY WITH SPECIAL REFERENCE TO SWELLING OF COTTON AND TO ITS UTILIZATION IN WATER-RESISTANT FABRICS. USDA Library List No. 44, 63 pp., March 1949.

The swelling of cotton fibers by absorption of water contributes to such effects as variation in the strength of yarn with humidity and the shrinkage of cloth when not suitably finished. Not always an advantage, this swelling property has recently been utilized as an aid in closing the minute interstices in cotton fabrics that must be

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resistant to the passage of water. However, improvement of the water resistance of cotton goods by means of swelling is so new that the required properties of fibers have not yet been well correlated with the properties needed in the fabrics. The present bibliography is intended to help bridge this gap by providing selected references on the swelling of cotton and other fibers, supplemented by references to methods applicable in estimating or measuring this swelling.

- 21 SCHUYTEN, H. A., WEAVER, J. W., and REID, J. David

AN INDEX OF THE WATER-REPELLENCY OF TEXTILES FROM THE SURFACE TENSION OF AQUEOUS SOLUTIONS. *Am. Dyestuff Reporter* 38 (9), 364-8 (1949)

A method has been devised for indicating the relative surface tensions of solids by determining the surface tension of a standard liquid which will wet the solid under selected conditions. The liquid selected was water containing various amounts of a wetting agent, prepared in such manner as to obtain a series of solutions with surface tension values ranging from 26 to 72 dynes/cm. By the use of solutions whose surface tensions are known, and by employing an electrical indicator, the point where fabrics become wet can be determined. The surface tension of the solution necessary to cause this wetting is taken as an index of water-repellency of the fabric. This system gives a range of at least 22 measurable units compared to 5 arbitrary units of the much used spray test.

- 22 SCOTT, Walter M.

CHEMURGIC ADVANCES IN COTTON AND PEANUTS. *Chemurgic Digest* 8, (5), 26-8 (1949).

The relationship between chemurgy and the work of the USDA regional laboratories is emphasized, and examples are cited of research in New Orleans which has broadened the potential industrial future of cotton and peanuts. While the overall program of the Southern Laboratory is discussed, the paper essentially is a report on progress made during the past year in research aimed at improving the economic position of these two crops in relation to that of competing products.

- 23 WARD, Kyle Jr.

RECENT RESEARCH ON COTTON PROPERTIES AT THE SOUTHERN REGIONAL RESEARCH LABORATORY. *Am. Dyestuff Reporter* 38 (3), 122-6 (1949).

Research on about 25 different properties of cotton by the Southern Laboratory and by contracting agencies is reviewed. The investigations

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are divided into three groups: those which lead to improved methods of evaluation and testing; those which provide the fundamental data basic to further study; and those which apply the basic data to obtain specific property improvements. The incidental improvement of some properties during studies made especially to improve others, and some of the products affected by the overall improvement, are discussed.

SEE ALSO NOS. 1, 4, 6, 7, 11, 12

Cottonseed, Peanuts, Rice, and Derived Products

24 ALTSCHUL, A. M.

CHEMICAL TREATMENTS OF SEEDS TO PREVENT HEATING AND DETERIORATION DURING STORAGE. The Cotton Gin and Oil Mill Press 50 (1), 42-10 (1949).

This article provides a brief summary of the present status of the research and developments on the problems involved in seed storage, and especially the more recent work being conducted at the Southern Regional Research Laboratory on cottonseed. The application of a rapid method for testing the ability of chemicals to inhibit free fatty acids formation in seed has resulted in the discovery of a number of widely different substances which can act as inhibitors in relatively low concentrations. It has been found that mixtures of two chemicals inhibit heating for much longer periods than does either one when used alone. Laboratory experiments have shown that a combination of mechanical aeration and chemical treatment is much more effective than either method alone.

25 BOATNER, Charlotte H., CASTILLON, Leah E., HALL, C. M., and NEELY, J. Winston

GOSSYPOL AND GOSSYPURPURIN IN COTTONSEED OF DIFFERENT VARIETIES OF G. BARBADENSE AND G. HIRSUTUM, AND VARIATION OF THE PIGMENTS DURING STORAGE OF THE SEED. J. Am. Oil Chemists' Soc. 26 (1), 19-25 (1949)

The initial contents of moisture, lipids, nitrogen, gossypol, and gossypurpurin were determined on seed from several varieties of cotton, after which the samples were stored under identical conditions and analyzed for gossypol and gossypurpurin at fixed intervals over a period of a year. Seed of the species G. barbadense contained more gossypol and very much more gossypurpurin than seed of the species G. hirsutum. Within the species G. barbadense, Sea Island seed contained more gossypol and less gossypurpurin than Egyptian seed.

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The content of gossypurpurin increased during storage of all of the seed, whereas that of gossypol varied in a number of different ways, increasing in some, decreasing in others, and remaining relatively constant in a few samples.

- 26 CONDON, M. Z., LAMBOU, M. G., VIGNES, J. L., LOE, J. B., and ALTSCHUL, A. M.

INHIBITORS OF HEATING AND DETERIORATION IN SEEDS. I. ETHYLENE CHLORHYDRIN AND RELATED COMPOUNDS. *Plant Physiology* 24 (2), 241-54 (1949)

Ethylene chlorhydrin in concentrations of about 0.19 percent (dry weight basis) successfully inhibited the formation of free fatty acids, while lower concentrations stimulated their formation, in moist flaxseed and cottonseed. All concentrations of this particular chemical inhibited heating to some extent. A comparison of related inhibitors revealed that reduced concentrations do not necessarily have the same effect on both heating and free fatty acid formation, each inhibitor displaying a characteristic pattern of behavior in this respect. Three such patterns of inhibitory behavior are described.

- 27 CHENG, F. W., and ARTHUR, Jett C. Jr.

VISCOSITY OF COTTONSEED PROTEIN DISPERSIONS. *J. Am. Oil Chemists' Soc.* 26 (4), 147-50 (1949).

Describes results of an investigation of the effect of various methods of preparing meal and of preparing cottonseed protein dispersions upon the viscosity characteristics of the dispersion. Tacky and viscous cottonseed protein dispersions can be prepared from proteins isolated from hexane-extracted meals, deglanded-hexane-extracted meals, and isopropanol-extracted meals by means of sodium hydroxide and trichloroacetate ion. The addition of sugars increases the viscosity of the dispersions, and dextrose significantly decreases the rate of change in the relative viscosity. Proteins isolated from hexane-extracted meals seem to be less modified than those isolated from deglanded-hexane-extracted meals, as indicated by the higher viscosity and stability of the dispersions.

- 28 FEUGE, R. O., and GROS, Audrey T.

MODIFICATION OF VEGETABLE OILS. VII. ALKALI CATALYZED INTERESTERIFICATION OF PEANUT OIL WITH ETHANOL. *J. Am. Oil Chemists' Soc.* 26 (3), 97-102 (1949).

In an investigation of peanut oil with ethanol, made under conditions suitable for large-scale operations and using sodium hydroxide as catalyst, it was found that: the optimum temperature for alcoholysis lies close to 50 degrees C., the rate of catalyst disappearance through

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saponification varies greatly with reaction time, being highest when alcoholysis commences and appreciable quantities of mono- and diglycerides are present; and that during alcoholysis the glyceryl ester linkages of a vegetable oil are broken in a reasonably random fashion corresponding statistically to the random distribution of different proportions of two elements in combinations of three. Curves and a table are presented to show the actual amount of monoglycerides, diglycerides, triglycerides, ethyl esters, glycerol, ethanol soap, and sodium hydroxide present in the reaction mixture at various times.

29 HOFFPAUIR, C. L.

MINUTES OF MEETING OF INTERNATIONAL COMMISSION ON FATS AND OILS. PARTS I, II AND III. A TRANSLATION. J. Am. Oil Chemists' Soc. 26 (2, 3 and 4), 61-5, 106-9, and 151-3 (1949).

This translation incorporates the decisions made on the unified international methods at the London meeting of the International Commission on Fats and Oils in July 1947, and also the plans for collaborative work to be done before the Commission's next meeting. Methods under discussion included those for the sampling and analysis for moisture and oil specified for several oil-bearing seeds. They also included those for alkalis and rosin in soaps, those for soluble and insoluble volatile acids and sterols in fats and oils, and those for the determination of thiocyanogen and peroxide numbers in fats and oil. The organization of, and representation on, the present International Commission on Fats and Oils also are given.

30 HOFFPAUIR, Carroll L.

UNIFIED METHODS FOR THE ANALYSIS OF FATTY MATERIALS, INTERNATIONAL UNION OF CHEMISTRY: A TRANSLATION. Mimeographed. AIC-225, 34 pp. (1949).

This is a translation of the unified methods for the analysis of fatty materials of the International Chemical Union and constitutes the third report of the International Commission for the study of fatty materials published in 1948. It describes methods for the preparation and analysis of oleaginous seeds; methods for the analysis of fats and oils for moisture, impurities, ash, acidity, unsaponifiable matter, density, refractive index, preparation of insoluble fatty acids, determination of titer, saponification number, iodine number, hydroxyl number, oxidized acids, polybromide number; and methods for the analysis of hard soaps for moisture, foreign substances insoluble in alcohol, total crude fatty acids, total alkali, total free alkali, rosin, and chlorides.

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- 31 KARON, Melvin L., and HILLERY, Barbara E.

HYGROSCOPIC EQUILIBRIUM OF PEANUTS. J. Am. Oil Chemists' Soc. 26 (1), 16-19 (1949).

The hygroscopic equilibrium curve for whole peanuts -- obtained over a range of 11 to 93 percent relative humidity at 25 degrees C. -- proved to be similar to that of cottonseed. All samples investigated, regardless of variety or the manner in which they were dried, exhibited very similar results. In the whole peanut, the shells contained more moisture than the kernels; however, the kernels contained a large percentage of oil which is responsible for some of the observed differences in moisture content. In the peanut kernel the skins contained the greatest percentage of moisture at constant relative humidity. Circulation of air over the samples and a raise in temperature to 35 degrees greatly increased the rate at which hygroscopic equilibrium was attained.

- 32 KARON, M. L., and ADAMS, Mabelle E.

HYGROSCOPIC EQUILIBRIUM OF RICE AND RICE FRACTIONS. Cereal Chemistry 26 (1), 1-12 (1949).

An investigation was made of the rate of sorption and desorption of moisture by rough rice, head rice, bran, polish, and hulls over the range of 11 to 93 percent relative humidity at 25 degrees C. The hygroscopic equilibrium of these same fractions was determined over the same relative humidity range. When the relative humidity of the atmosphere at 25 degrees C. was raised from 10 to 90 percent, the moisture content of whole rice and its fractions increased as follows: rough rice from 4.4 to 17.6 percent, polished rice from 5.2 to 18.8 percent, bran from 5.0 to 18.0 percent, polish from 5.3 to 18.0 percent, and hulls from 3.7 to 15.3 percent.

- 33 MARKLEY, K. S. and JENKINS, Dale W.

OIL PALM RESOURCES OF THE AMERICAN HEMISPHERE. J. Am. Oil Chemists' Soc. 26 (6), 257-67 (1949).

The American hemisphere is dependant on the Orient, the South Pacific, and West Africa for the bulk of its supplies of lauric acid-type oils such as coconut and palm kernel and of palm oil, requirements for which are estimated at more than 375,000 tons annually. The coconut palm, Cocos nucifera, and African oil palm, Elaeis guineensis, are entirely adaptable to plantation cultivation in the American hemisphere.

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In addition, the American oil palm, Corozo oleifera, an indigenous palm, is probably also adaptable to plantation cultivation. Wild oil-bearing palms, while numbered in the tens and perhaps hundreds of millions, cannot be depended on at present as an economic source of lauric acid oils.

- 34 SWIFT, C. E., O'CONNOR, R. T., BROWN, L. E., and DOLLEAR, F. G.

THE ALDEHYDES PRODUCED DURING THE AUTOXIDATION OF COTTONSEED OIL.
J. Am. Oil Chemists' Soc. 26 (6), 297-300 (1949).

Spectrophotometric evidence was obtained that Δ^2 - and $\Delta^{2:4}$ -unsaturated aldehydes are produced during the autoxidation of cottonseed oil. The unsaturated carbonyls were converted into semicarbazones and 2,4-dinitrophenylhydrazones whose characteristics indicated that the oxidation of cottonseed oil produces $\Delta^{2:4}$ -decadienal, Δ^2 -octenal, and hexanal. Although the exact mechanism of their formation has not been established, these aldehydes are believed to result from the decomposition of the isomeric hydroperoxides of linoleic acid, the principal fatty acid constituent of cottonseed oil.

- 35 SWIFT, C. E., O'CONNOR, R. T., BROWN, L. E., and DOLLEAR, F. G.

2-DECEN-1-OL, 2-UNDECEN-1-OL, 2-DECENAL, 2-UNDECENAL AND DERIVATIVES.
J. Am. Chem. Soc. 71 (4), 1512 (1949).

Data is given on the melting points and analyses of 3,5-dinitrobenzoates and *p*-nitrophenylurethans of 2-Decen-1-ol and 2-undecen-1-ol, and on semicarbazones and 2,4-dinitrophenylhydrazones of 2-Decenal and 2-undecenal. The absorption spectra of the aldehydes, semicarbazones, and 2,4-dinitrophenylhydrazones exhibit single maxima having characteristic extinction coefficients for these types of compounds.

- 36 WILLIAMS, P. A., HADDEN, R. P., HALL, C. M., CASTILLON, L. E., GUICE, W. A., O'CONNOR, R. T., and BOATNER, C. H.

PROCESSING OF COTTONSEED. IV. EFFECT OF PREPARATION AND COOKING OF MEATS ON THE BLEACH COLOR AND STORAGE PROPERTIES OF SCREW-PRESSED OILS.
J. Am. Oil Chemists' Soc. 26 (1), 28-34 (1949).

In order to study their effect on the characteristics of cottonseed meal and oil produced by screw-pressing, conditions of processing were varied with respect to preparation of meats, addition of water, and the temperature and duration of cooking. In laboratory-scale experiments 10 percent of water added to the flaked meats prior to cooking at 235 to 244 degrees F. for 1-1/2 hours resulted in a low bleach color

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in the expressed oils. Mill-scale tests indicated that cooking in the presence of relatively large amounts of water improves the oil's storage properties but not its initial bleach color. On the other hand, unwetted rolled or ground meats cooked at a low temperature resulted in low initial bleach color of the oil with very little reversion during storage at room temperature. Widely varying amounts of gossypol were found in both oils and meals produced from meats cooked under various conditions.

SEE ALSO NOS. 4 and 22.

Sweetpotatoes

37 BATSON, D. M., and HOGAN, J. T.

ESTIMATION OF MOISTURE IN SWEET POTATO STARCH. Anal. Chem. 21 (6), 718-21 (1949).

A simple and rapid specific gravity method for the estimation of moisture in sweet potato starch at moisture contents ranging from 15 to 50 percent is described, by which a determination accurate to within about 0.5 percent moisture may be completed in approximately seven minutes. The method, which is based in principle on the conventional pycnometer procedure for determining particle density, allows the use of a torsion balance, large starch samples, and volumetric flasks, and thus is convenient for either laboratory or plant operations. Weight data are converted graphically to terms of moisture content and temperature compensation data are applied to eliminate the necessity for careful control of working temperature. Directions are given for adapting the method to the estimation of moisture in other starches and in other suitable materials.

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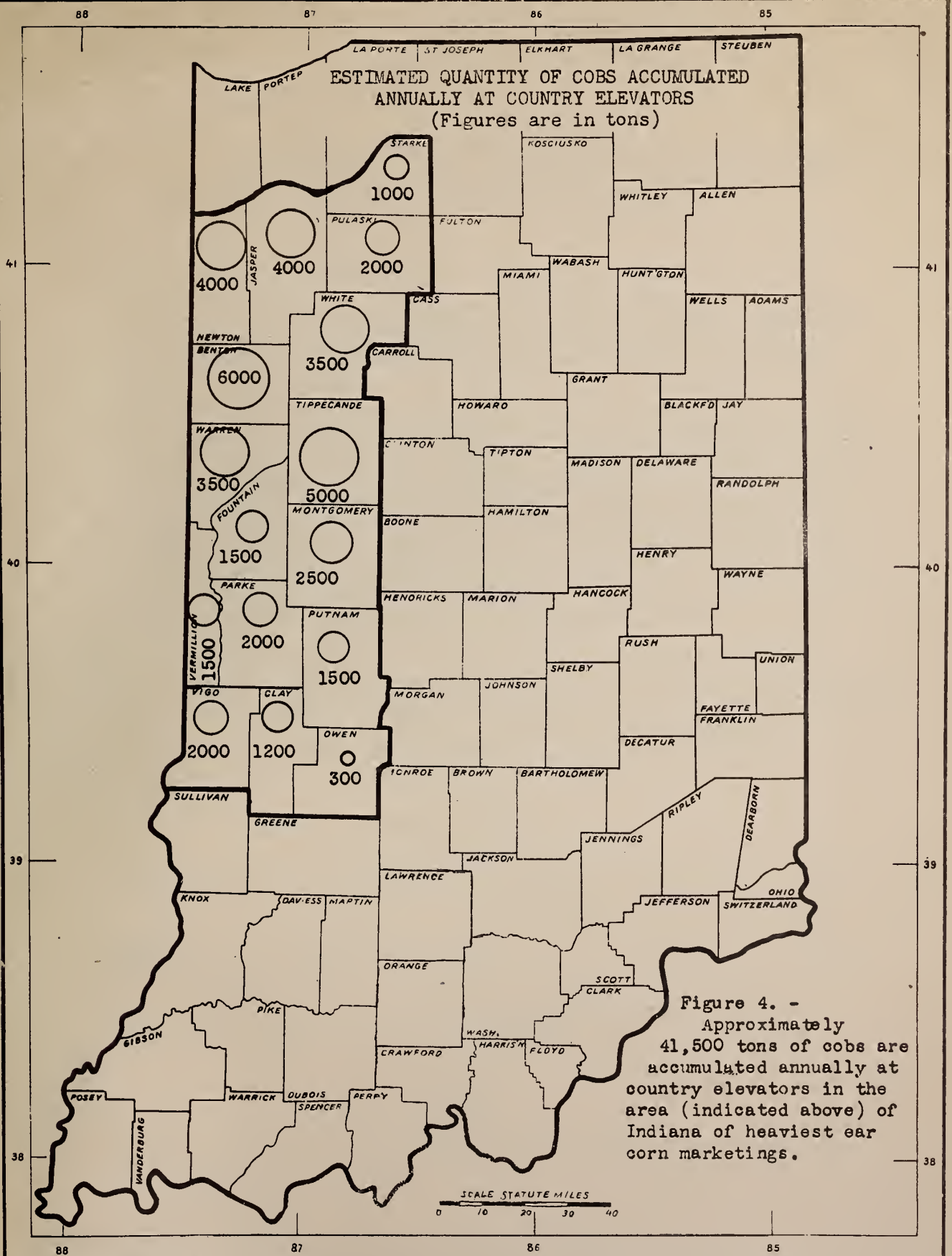
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Article
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finishing studies in making tobacco shade cloth; and the potential commercial possibilities of the process for recovering starch from sweetpotatoes.

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RESEARCH ON SOUTHERN AGRICULTURAL PRODUCTS. Proceedings of the Thirty-Ninth Annual Meeting, American Railway Development Association, April 5-7, pp. 38-47 (1948). Mimeographed.

The increased utilization of southern farm products made possible through scientific research is discussed as a contribution to the future welfare of the South, and the Southern Regional Research Laboratory's part in this research is outlined. Efforts are directed towards modifying the qualities of cotton and cottonseed, sweetpotatoes, peanuts and rice, so as to make these leading southern commodities suitable for new or enlarged technical, scientific and industrial uses.

The importance of each of these commodities to the industrial development of the South is emphasized by an analysis of its present economic position and competition from other products. Examples of research which are helping to provide enlarged markets are cited.

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